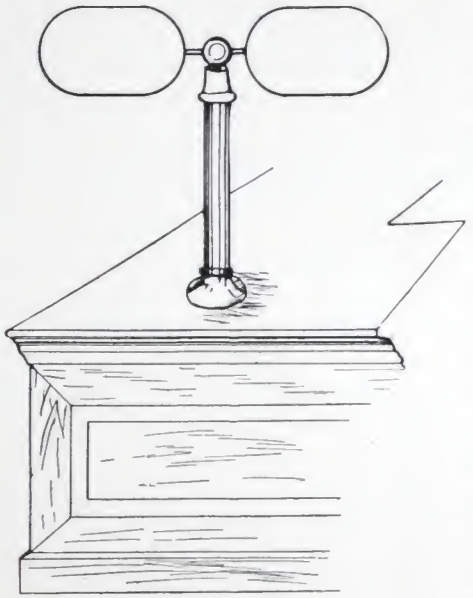
CATALOGUE

STANDARD FANS

The ROBBINS & MYERS Co.
SPRINGFIELD.
OHIO.

... EVOLUTION ...

ABOUT fifteen years ago the proprietor of a restaurant in one of our large cities was in the habit of employing a man to wield a large palm-leaf fan to keep off flies and make his customers more comfortable during the very warm weather. The proprietor being of an inventive turn of mind conceived the idea of employing mechanical means to wield the fan and dispense with the "fan man." The result of his labors was something like accompanying illustration.



The four blades were formed of wire frames, on which were stretched red paper-muslin covers. A shaft ran through the hollow tube or column, and was supplied with a pulley below the counter and driven by a belt from his engine in the basement. These, we believe, were the first mechanical fans, and they were so successful that several firms started to make them on a rather large scale. In the natural course of events the fans were much improved — first, sheet metal blades, and afterwards thin blades of wood replaced the muslin, and hangers were devised to carry the fan-shaft and pulley, and to hang from the ceiling. And fans were designed with clutches and regulating devices for changing the angle of the blades so as to throw more or less air as the day was warmer or cooler; but the general principle remained the same, i. e., that of a fan-carrying shaft driven by a belt, from some external source of power. It was in driving these belt fans that the electric motor found its first general application, and in this service that the public first learned of the good qualities of the motor as a source of power in small units.

ABOUT the time belt fans were becoming popular and their use was extending, a rival appeared in the form of a six-bladed screw-propeller sort of a thing, coupled direct on the shaft of a small electric motor—the combination since being known as the electric buzz fan. The buzz fan seemed to be a success from the start. It took very little room, blew a strong breeze, and had no unsightly belts to keep dropping off. It seemed to fill entirely the proverbial "long-felt want," and it would have driven its slow-going big rival off the market but for one fault—it would not keep out flies. It was an error common to customers and dealers alike that all that was necessary to keep off flies was a strong breeze directed toward their favorite camp-ground, and numbers of buzz fans were bought and sold for this purpose—ventilation and cooling effects being entirely a secondary consideration. This illusion, like most popular errors, was slow in disappearing, and many customers do not know even at this time why a ceiling fan keeps out flies. It will be noticed that a breeze has no effect whatever upon them; and yet, whenever a ceiling fan starts up they retire from the room. This is on account of the successive puffs of air from the slower-moving large blades of the ceiling fan, and—pardon this stretch of imagination—from the mental effect on the fly of the waving of the arms of his giant foe. It will be noticed that a fly has no sense of distance, and so long as he can see the big blades moving continuously above him, his moral courage is all gone, and he will not stay in the room. So, after the people who had bought the buzz fans for this purpose found that the flies stayed, and, as one of our disgusted Teutonic friends has it, "Shust blayed in der breeze," they called up the fan dealer and showed him the results.

Now, here was a crisis. They did not want the belt fan, because it was unsightly and required a good deal of attention, dripped oil one day and ran dry the next; and the little buzzer would not do the work.

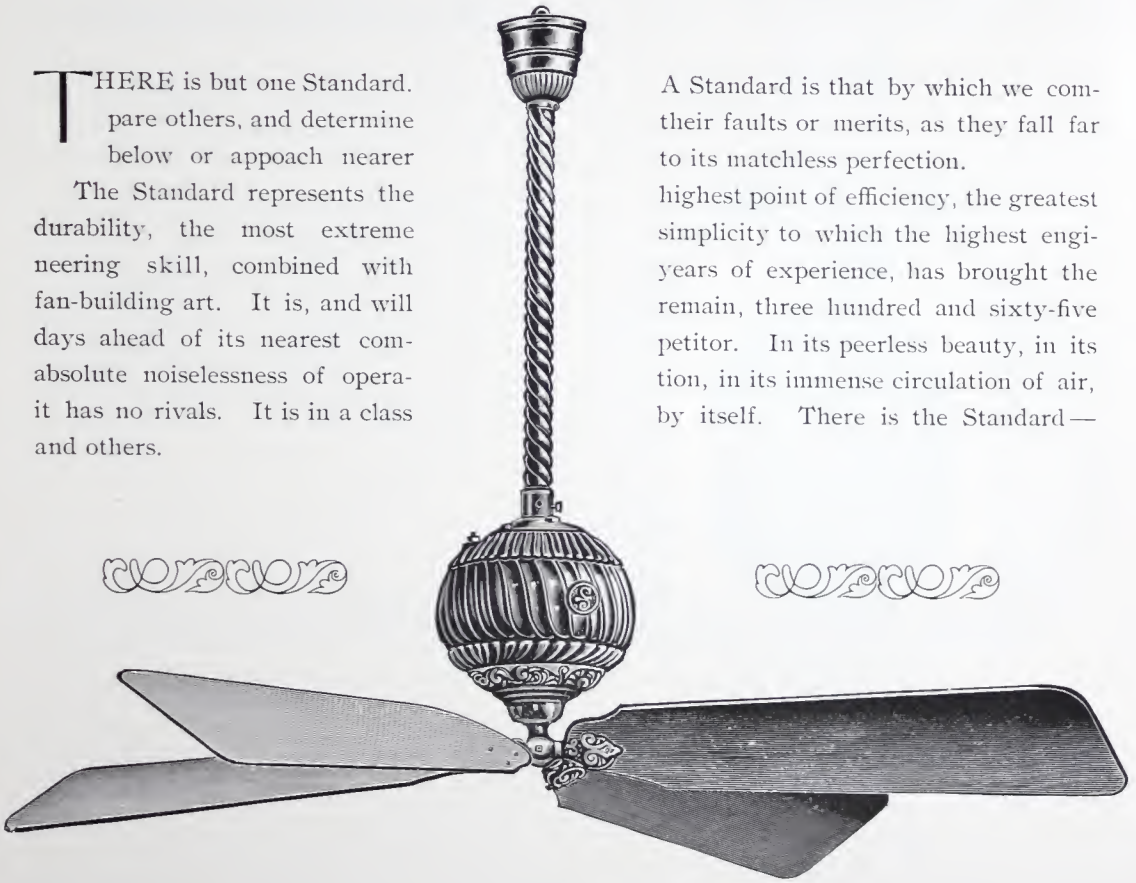
IN the light of subsequent achievement it seems to have been but a short, easy, and natural step from the combination of the big, slow, troublesome and ugly belt fan that *would* do the work, and the little, fast, handsome and otherwise satisfactory buzz fan that *would not*, to the quick-moving, highly-efficient, handsome modern Electric Ceiling Fan that combines all the merits, with none of the faults of either of the old types. The Philistine would say, "Take the small blades off the little motor, hang it on the ceiling, and put on the big blades, and there you are." But there you are not. The problem has been solved, and we have the correct solution, but it was not so easy. We could not know at once *all* the conditions we had to meet. However, as we now know them, the conditions, briefly stated, are these. The cost of production must be low enough to bring the selling price within the reach of the customer. The speed must be over one hundred, and under two hundred revolutions per minute, or it will have no effect on the flies. It must be noiseless, or it will not do in quiet places. It must be self-oiling; that is, it must contain oil enough in suitable reservoirs to last all Summer, and these reservoirs must be so arranged that the oil will flow constantly through the bearings and back into the cups while the fan is running; for, when a man buys an Electric Ceiling Fan, he does not want to be bothered climbing up a step-ladder to oil it every day — he might as well have kept his old belt fans. And this oil must be positively confined, so it can not drip on the carpet or goods, or someone's head. The wearing parts of a fan must be so arranged that they will adjust themselves for wear. The brushes must feed all up, and then fly out where they will do no harm, and simply stop the fan until new ones are put in. The cost of running must be kept down to the lowest possible limit; that means high efficiency. When you buy the electric current to run the fan, you are simply buying breeze, nothing more. The question should be, how much

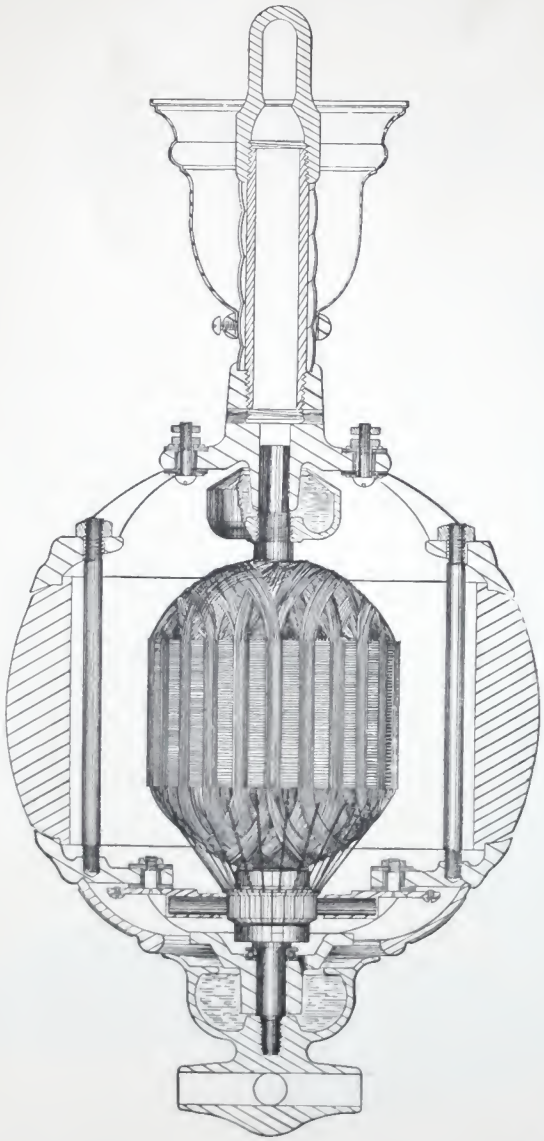
breeze am I getting for my money? Is not all the current used for making the breeze? No, in some fans — most of them, in fact — the larger part of the current is used in heating the parts of the fan and in *friction in bearings*, and only what is left after taking out these losses is turned into breeze. So it is extremely important to keep down the friction and heat losses to the lowest possible limit. We shall see presently how this is done. Let us answer right here a question or two which we are often asked. The fan will not run itself; it is not a source of power; it only receives power through the wires in the form of what is called a current of electricity, and the current gives out power in forcing its way through the fan, just as steam gives out power in forcing its way through the steam engine. Another question answered. It is not impossible but *is* impractical to run ceiling fans by any form of battery, they must be connected to a dynamo, located either in your own building or in some central station that makes a business of furnishing electric power for motors.

We will now proceed to an examination in detail of the fan, which, perhaps better than any other ever built, meets all the conditions desirable in a fan for general use. The cut on the opposite page shows our "Style A" Electric Ceiling Fan as it looks when hanging on the ceiling. You see here none of its working parts, and to the observer unfamiliar with electric devices there is nothing in sight to "make it go;" nothing but an artistic and handsome metallic globe hanging from a carved rod or tube of some kind, and supporting, in its turn, a set of large, polished wood blades.

THERE is but one Standard. A Standard is that by which we compare others, and determine their faults or merits, as they fall far below or appoach nearer to its matchless perfection.

The Standard represents the highest point of efficiency, the greatest durability, the most extreme simplicity to which the highest engineering skill, combined with years of experience, has brought the fan-building art. It is, and will remain, three hundred and sixty-five days ahead of its nearest competitor. In its peerless beauty, in its absolute noiselessness of operation, in its immense circulation of air, it has no rivals. It is in a class by itself. There is the Standard—and others.



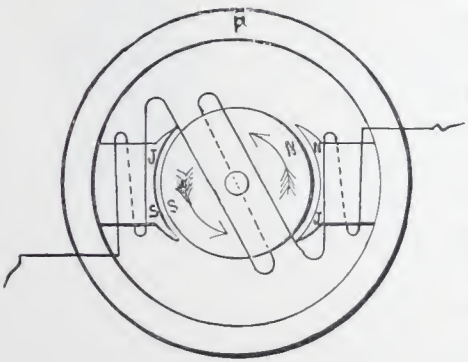


HERE we show a section drawing of the complete fan; or, in other words, a picture of the fan as it would look if the outer parts were sawed through to the center, and half of the fan removed to show the arrangement of the working parts.

EVERY electric motor consists of two essential parts — the one, usually stationary part, called the field magnet; and the other, the moving part, called the armature. We show here a diagram, illustrating the relation of these parts, from which we expect to make plain to the reader the action of the motor.

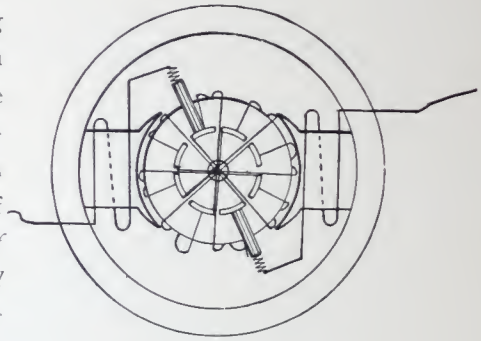
It is a principle of electricity, that when an electric current is caused to pass through a wire wound around a piece of iron, it produces magnetism in the iron; and the magnetism lasts as long as the current continues to flow; and is stronger or weaker in its action as the *current* is stronger or weaker, and as it passes more or less times around the iron.

Now referring to the diagram. J, J, are two pieces of steel, joined to the inside of the yoke ring F, which is of cast iron, and which serves to connect them and hold them in place. The inner ends of the pole pieces, as we call the pieces of steel, point toward the center, and between them is placed a cylinder of iron called the armature. Now, if we cause an electric current to pass through the wires indicated in the diagram, the pole pieces and the cylinder or armature will become magnetized with poles, as indicated by letters N, N, and S, S; and as like poles repel and unlike poles attract each other, the armature, if it be free to move, will turn in the direction indicated by the arrow, until all the poles are in line, and will then stop. We will now add another element, and show in a new diagram how the motion is made continuous.

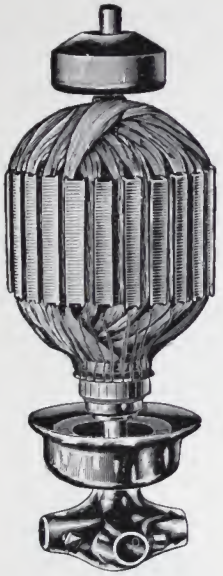


We have now added a few more coils of wire to our armature, and a bundle of copper bars called the commutator; and also a pair of carbon brushes or fingers to rub on the commutator, and carry the current into it and through it to the coils on the armature. These latter are connected to the copper bars at their ends for that purpose. It will now be seen that when the armature starts to move while the brushes stand still, the current will be directly connected to each of the coils in succession as the bars slide one after another

under the brushes, and there is a constant shifting backward of the magnetic polarity of the armature; and the revolution has become continuous. This, with the bearing, is all there is to any motor. We now see why the power given out to the fan blades depends on the strength of the magnetism. In order to have a powerful fan then, we must make our magnets as strong as possible. Now, remembering that the magnetism which is caused by the current in the coils on the pole pieces travels around through what is known as the magnetic circuit, which consists of the pole pieces, the iron in the armature, and the yoke, we see that the strength of our magnets depends on three quantities: *the quantity of current used, the number of times the current is carried around the magnets, and the resistance which the magnetic circuit offers to the flow of magnetism.* These three things are important to remember. The first it is important to keep down; for, if we do not, the fan will cost us too much to run. The second one must be limited; or, if the coils have too many turns around which the current is to be carried, then the force of the current willl be lost in heating the coils. This brings us to the last—the resistance of the magnetic circuit. This depends on the distance the magnetism must travel, and on the cross section of the iron it travels through. These you will see by referring to the following cut showing field magnets separated, which we make quite large; and that is why the fan is so heavy.



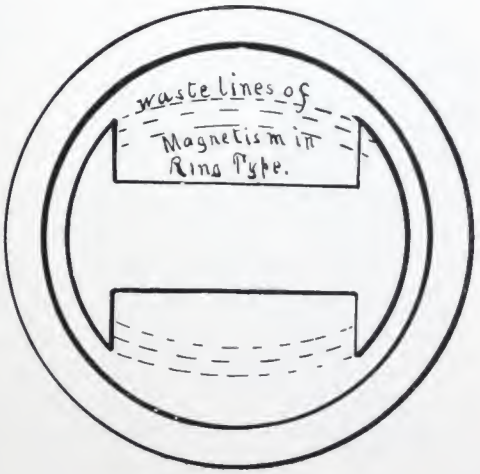
But there is another much more important element in the magnetic resistance, and that is the air gap between the iron of the armature and the pole pieces, through which the magnetism must jump twice to get around the circuit. The resistance of this gap is much greater than that of all the rest of the circuit, and so it is important to make it as small as possible. For this reason, and also for the better protection of the coils, we cut deep slots in the core of the armature and wind the wire down in the slots, thus bringing the iron of the armature up between the coils, close to the face of the pole pieces. Many motors, and



most fan motors, are built with an armature in the form of a ring, with the pole pieces inside; but in this type a large part of the magnetism which would otherwise be used in furnishing power to the blades, leaks across from pole to pole, without going through the armature at all. By making a magnet with the pole pieces turned inward, and placing the armature between them, we avoid this leakage entirely. We thus have a form of construction which makes a minimum of wire necessary, and which keeps down the heat loss and leakage of power. We now come to the friction loss, which is confined to the

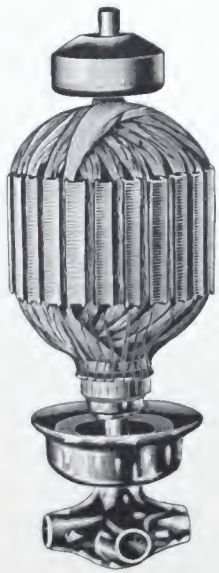
... BEARINGS ...

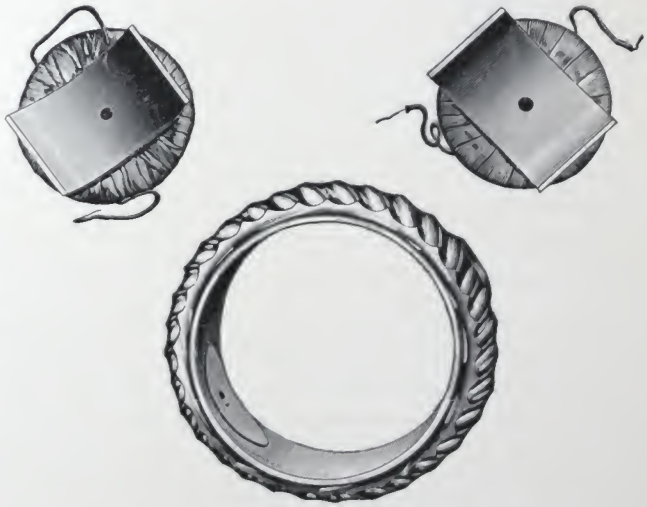
We will now see why the fan is so extremely light running. You will see on the end of the armature, on this page, and again in the section drawing, on page 8, a large cup or reservoir completely surrounding the shaft which forms the upper bearings. There is also another large cup on top of the fan holder, which screws on the lower end of the shaft and covers the bearings. These cups, when once filled, keep the two bearings completely and continuously bathed in oil. The oil can not get out, and they are so shielded that the dust and dirt can not get in. And the only dirt that can get into the oil is the small particles of iron and steel powder from the slow wearing of the bearings; and you will see that there is a small recess or well in the bottom of the cup for these particles to settle into, leaving the oil clean and pure for the bearings. In the lower plate, at the



top of the lower bearing, is placed *a tool-steel ball-race*, containing a row or *circle of steel balls*, on which rests a flat steel washer; and thus *the entire weight* of the moving part of the fan, blades and all, is carried on *a ball-bearing*, *running in oil*, and the friction factor is almost entirely eliminated from the fan.

The current, you will remember, is carried into the armature while it is running, by the brushes which are held in firm but gentle contact with the copper bars by piano wire springs. As these brushes are of fine grained carbon, and highly polished on the point of contact, there is practically no friction here, and very little wear; but as they do wear the springs keep the brushes feeding forward until they are all gone; and then the fan will refuse to run until new brushes have been put in place, this requiring but a few minutes' time, and the brushes costing but a few cents each. The commutator is placed below the armature, where it is easily accessible and thoroughly protected from dirt and oil, which might otherwise cause the electric current to jump across from bar to bar, instead of going around through the armature — thus causing what is called a burn-out on the commutator.





Cuts showing Yoke Rim, Field Magnets, Pole Pieces, and Coils.

Cuts showing top and bottom views of the Upper Plate, Upper Bearing, Binding Screws, and Pipe Socket.

Cuts showing top and bottom views of the Lower Plate—BALL BEARING—and Brush Holders.

HAVING now shown how we sustain our very strong claims for marked efficiency, strong breeze, durability, and simplicity, by the general excellence of our design, we would point out to you with pardonable pride that no attempt has ever been made to rival the artistic merit and extreme beauty of our fans, as shown in their various finishes in the few following pages.

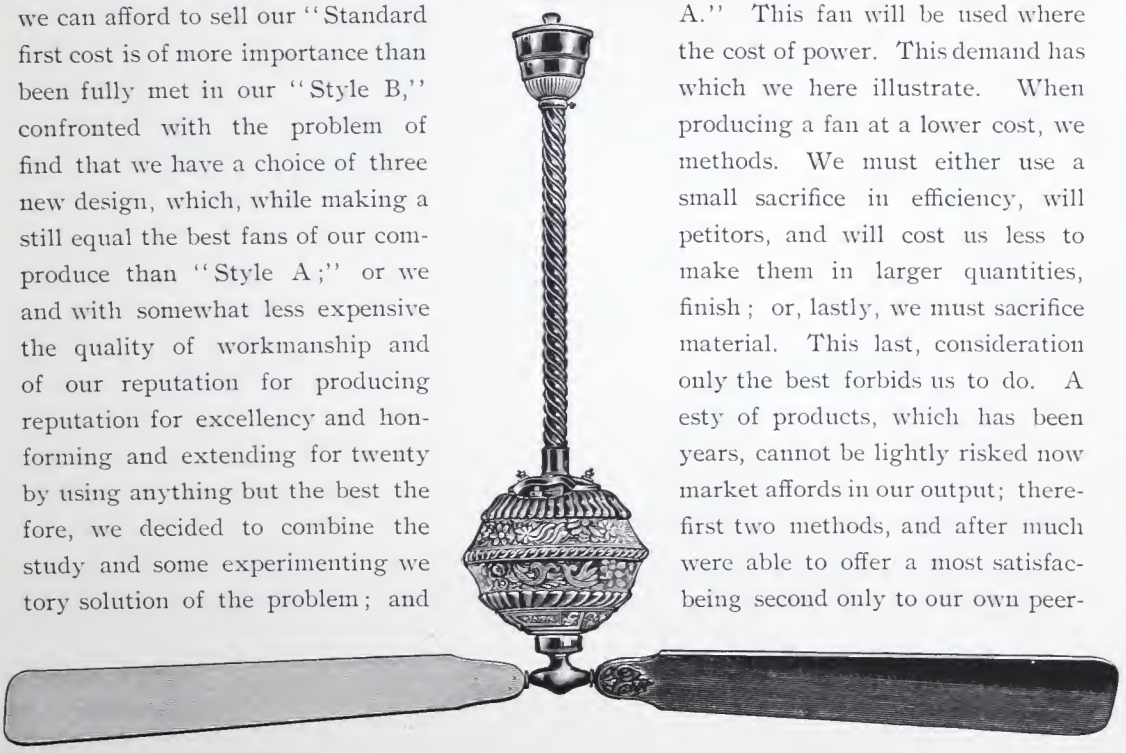
"Style A," Oxidized Copper.

"Style A," Polished Nickel.

"Style A," Lacquered Brass.

... STYLE B ...

THE first cost of an article often seems to be of more consequence to the purchaser than operating expense, and there is no questioning the fact that the lower-priced goods offer superior attractions where he can not afford the time to make a close study of the relative merits of the different types he may be offered. There is a good legitimate demand for an Electric Ceiling Fan that will run at a good speed with an efficiency about equal to that of the best fans of most makers, and to be sold for a somewhat less cost than we can afford to sell our "Standard A." This fan will be used where first cost is of more importance than the cost of power. This demand has been fully met in our "Style B," which we here illustrate. When confronted with the problem of producing a fan at a lower cost, we find that we have a choice of three methods. We must either use a new design, which, while making a small sacrifice in efficiency, will still equal the best fans of our competitors, and will cost us less to produce than "Style A;" or we make them in larger quantities, and with somewhat less expensive finish; or, lastly, we must sacrifice the quality of workmanship and material. This last, consideration of our reputation for producing only the best forbids us to do. A reputation for excellency and honesty of products, which has been forming and extending for twenty years, cannot be lightly risked now by using anything but the best the market affords in our output; therefore, we decided to combine the first two methods, and after much study and some experimenting we were able to offer a most satisfactory solution of the problem; and being second only to our own peer-



less "Standard A," we have called it our "Style B." In order that the customer may know just what he is buying, we show here a cut of the parts of our "Style B," separated, that they may be compared with the "Standard A" on same page.

It will be noticed that instead of the field magnet having separate pole pieces of steel with circular coils slipped on, said pole pieces being held to their curved seats by cap screws as in "Style A," the whole field magnet is cast in one piece, the polar projections being cast pointing in opposite directions, and so shaped as to allow the rectangular coils to be slipped on over their ends and drawn to place. Now, *cast iron* can carry only 40 per cent as much magnetism per square inch as steel; and, therefore, we are compelled to make up for its higher resistance by using more of it. This makes the "waist" of the magnet, or that part which the coils surround, much larger in section. As there must be the same number of turns of copper wire in the coils, and as each turn must be longer in order to go around the larger pole piece, it will be seen that the total length of wire which the current has to travel through is somewhat longer and the heat loss somewhat greater than in the "Standard A."

This is all the difference between the fans. The "Style B" has the same perfect oiling reservoirs, the same frictionless ball bearings, is made in the same shop by the same workmen. The cast-iron field costs us less than the steel, and we save the labor of making the perfect magnetic joint at the union of the pole pieces and the yoke ring; and so you pay less for the fan.

Magnet "Style A."

Cuts showing Field Magnets of
both
Styles A and B,
separated for comparison